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## **Supplemental Material**

### **Season of Conception, Smoking, and Preeclampsia in Norway**

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**Figure S2.** Overall unadjusted smoothed rate and fitted first harmonic adjusted relative rate of birth with PE based on analysis that excluded foreign-born mothers. A revision of Figure 1 in the paper based on analysis that excludes foreign-born mothers. The smoothed curve in Figure a is based on a moving average of outcomes

that uses a window encompassing plus and minus 30 days from each day of the year, thus estimating the fraction with PE among pregnancies conceived at each day of the year. The fitted relative rate shown in Figure b is based on the first harmonic (sine and cosine) fit to a model that is adjusted for maternal age, maternal age squared, education, primiparity, smoking (in 3 categories), marriage status, region of Norway, and interaction between primiparity and region. The curve shown is based on entering the mean for all covariates, centering the estimated log hazard ratio and then exponentiating it.

**Figure S3.** Overall fitted first harmonic adjusted relative rate of PE based on MICE results. A revision of Figure 1b based on averaging over 50 MICE results. The fitted relative rate shown is based on the first harmonic (sine and cosine) fit to a model that is adjusted for maternal age, maternal age squared, education, primiparity, smoking (in 3 categories), marriage status, region of Norway, and interaction between primiparity and region. The curve shown is based on entering the mean for all covariates, centering the estimated log hazard ratio and then exponentiating it. The solid curve is based on MICE results and the dotted curve represents the original curve in Figure 1b.

**Figure S4.** Overall unadjusted smoothed rate and fitted adjusted relative rate of PE when modeling the seasonal effects using time of birth instead of time of conception. The smoothed curve in a is based on a moving average of outcomes that uses a window encompassing plus and minus 30 days from each day of the year, thus estimating the fraction with PE among births at each day of the year. The fitted relative rate shown in b is based on the first harmonic (sine and cosine) fit to a logistic model that is adjusted for maternal age, maternal age squared, education, primiparity, smoking (in 3 categories), marriage status, region of Norway, and interaction between primiparity and region. The curve shown is based on entering the mean for all covariates, centering the estimated log odds ratio and then exponentiating it.

Table S1. Characteristics of pregnancies in Oslo and Troms

		no PE	PE and gestation length $\geq$ 37 weeks	PE and gestation length $<$ 37 weeks
Total N		104287	2729	1007
Average maternal age		30.3	30.1	30.4
County	Oslo	85252 (81.7)	2272 (83.3)	808 (80.2)
	Troms	19035 (18.3)	457 (16.7)	199 (19.8)
Maternal smoking	Nonsmoker	53262 (51.1)	1379 (50.5)	447 (44.4)
	Quit smoking	2493 (2.4)	72 (2.6)	26 (2.6)
	Smoked throughout	4733 (4.5)	72 (2.6)	21 (2.1)
	Missing	43799 (42)	1206 (44.2)	513 (50.9)
Mother's education	0-9 years	14735 (14.1)	337 (12.3)	141 (14)
	10-14 years	22854 (21.9)	730 (26.7)	247 (24.5)
	>15 years	55332 (53.1)	1498 (54.9)	523 (51.9)
	Missing	11366 (10.9)	164 (6)	96 (9.5)
Primiparity	Parous	46853 (44.9)	757 (27.7)	326 (32.4)
	Primiparous	57434 (55.1)	1972 (72.3)	681 (67.6)
Mother's birth country	Other	37613 (36.1)	784 (28.7)	329 (32.7)
	Norway	66192 (63.5)	1940 (71.1)	659 (65.4)
	Missing	482 (0.5)	5 (0.2)	19 (1.9)
Married or living together as married?	No	10270 (9.8)	256 (9.4)	111 (11.0)
	Yes	94017 (90.2)	2473 (90.6)	896 (89.0)

Table S2. Tests of relationship between covariates and season of conception

Variable Name	Variable Category	Statistical Model used	Chi-square	DF	P-value
Smoking	yes/no	logistic regression	92.0	2	1.05E-20
Married or live together as married	yes/no	logistic regression	60.4	2	7.66E-14
Primiparity	yes/no	logistic regression	313.6	2	7.99E-69
Education	15 years or more (yes/no)	logistic regression	92.0	2	1.05E-20
Sex of baby	boy/girl	logistic regression	2.59	2	0.27
Maternal age	continuous	linear regression	20.5	2	3.50E-05
Maternal age squared	continuous	linear regression	10.8	2	4.51E-03
Region	southeast/north/ west coast	polytomous regression	31.0	4	3.12E-06
Smoking	nonsmoker/quitter/smoke throughout	polytomous regression	97.4	4	2.59E-20
Education	0-9 year/10-14 years/15+ years	polytomous regression	147.0	4	9.08E-31

Table S3. Coefficients of confounders, without adjustment for season of conception, but with adjustment for the other covariates shown.

Variable	Reference category	Coefficient	Standard Error	HR	95% CI
Smoked then quit	Nonsmoker	-0.09	0.03	0.91	(0.85, 0.97)
Smoked throughout or at end of pregnancy	Nonsmoker	-0.50	0.03	0.61	(0.57, 0.65)
North	Southeast region	0.18	0.04	1.19	(1.09, 1.30)
West coast	Southeast region	-0.05	0.03	0.96	(0.90, 1.01)
Year of education between 10-14	Lowest education	-0.01	0.03	0.99	(0.94, 1.04)
Year of education >= 15	Lowest education	-0.24	0.03	0.78	(0.74, 0.82)
Primiparous	Parous	0.71	0.03	2.04	(1.94, 2.14)
Mother's age		-0.12	0.01	0.89	(0.87, 0.92)
Mother's age squared		0.002	0.0002	1.00	(1.00, 1.00)
Married or living together as married	Not married or living together	0.01	0.03	1.01	(0.94, 1.07)
Interaction between primiparous and north		-0.09	0.06	0.91	(0.82, 1.02)
Interaction between primiparous and west coast		0.06	0.04	1.06	(0.99, 1.14)

Figure S1. Unadjusted smoothed rates and fitted adjusted relative rates of birth with PE for time before (a,b) and time after (c,d) 34 weeks gestation in Norway. The smoothed curve in a and c is based on a moving average of outcomes that uses a window encompassing plus and minus 30 days from each day of the year, thus estimating the fraction with PE among pregnancies conceived at each day of the year. The fitted relative rates shown in b and d are based on the first harmonic (sine and cosine) fit separately to each of the two gestational age categories, gestational age < 34 weeks (b), and gestational age  $\geq$  34 weeks (d), with models that are adjusted for the covariates: maternal age, maternal age squared, education, primiparity, smoking (in 3 categories), marriage status, region (in 3 categories) and interaction between primiparity and region. The curve shown is based on entering the preterm-category-specific mean for all covariates, centering the estimated log hazard ratio and then exponentiating it.

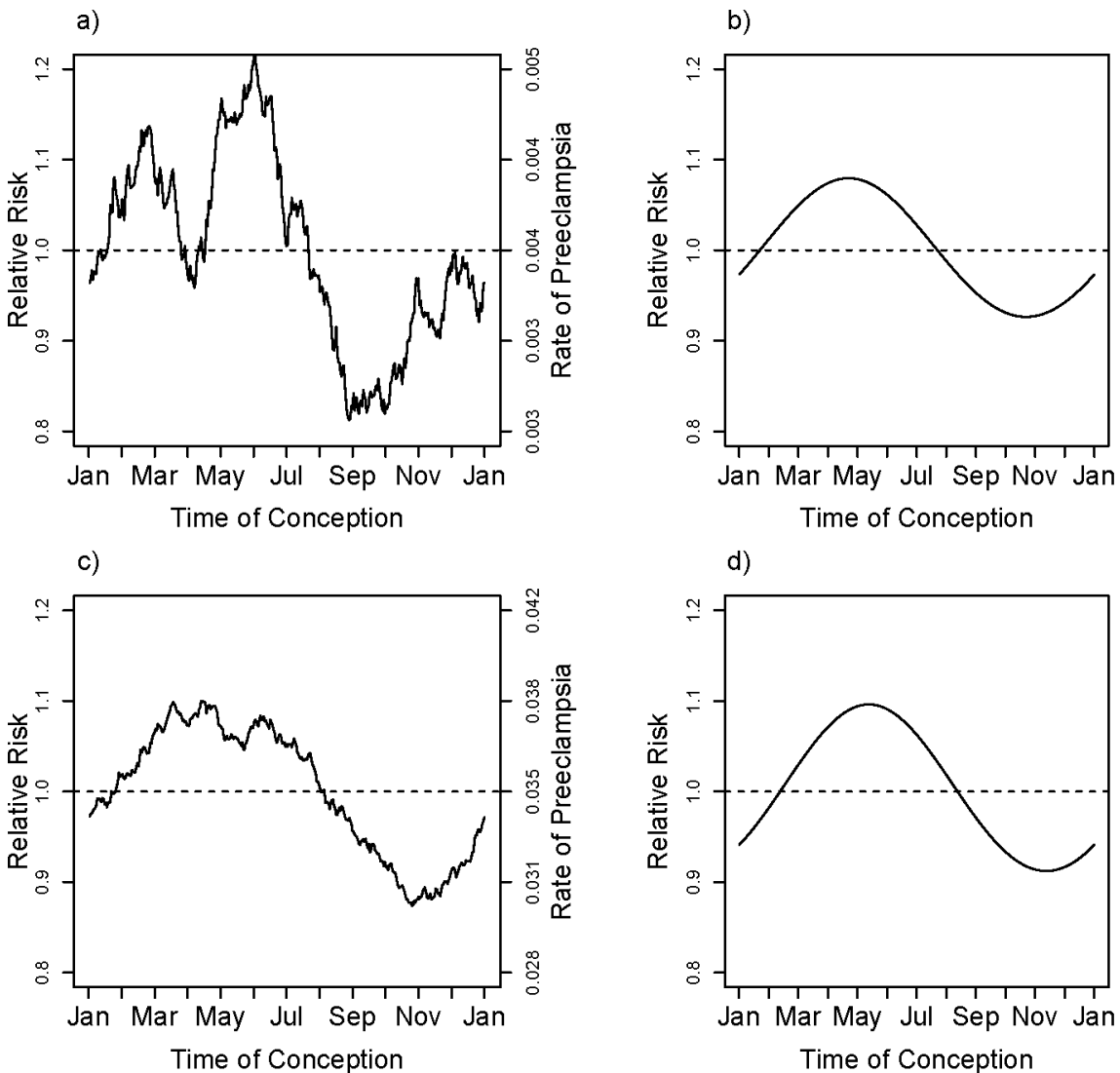


Figure S2. Overall unadjusted smoothed rate and fitted first harmonic adjusted relative rate of birth with PE based on analysis that excluded foreign-born mothers. A revision of Figure 1 in the paper based on analysis that excludes foreign-born mothers. The smoothed curve in Figure a is based on a moving average of outcomes that uses a window encompassing plus and minus 30 days from each day of the year, thus estimating the fraction with PE among pregnancies conceived at each day of the year. The fitted relative rate shown in Figure b is based on the first harmonic (sine and cosine) fit to a model that is adjusted for maternal age, maternal age squared, education, primiparity, smoking (in 3 categories), marriage status, region of Norway, and interaction between primiparity and region. The curve shown is based on entering the mean for all covariates, centering the estimated log hazard ratio and then exponentiating it.

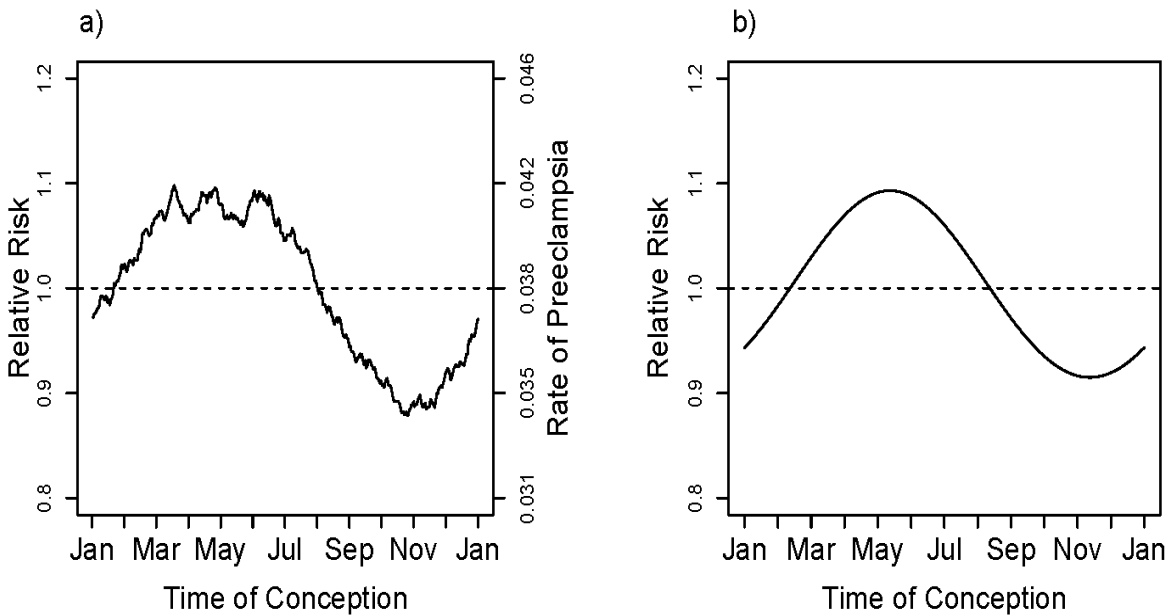


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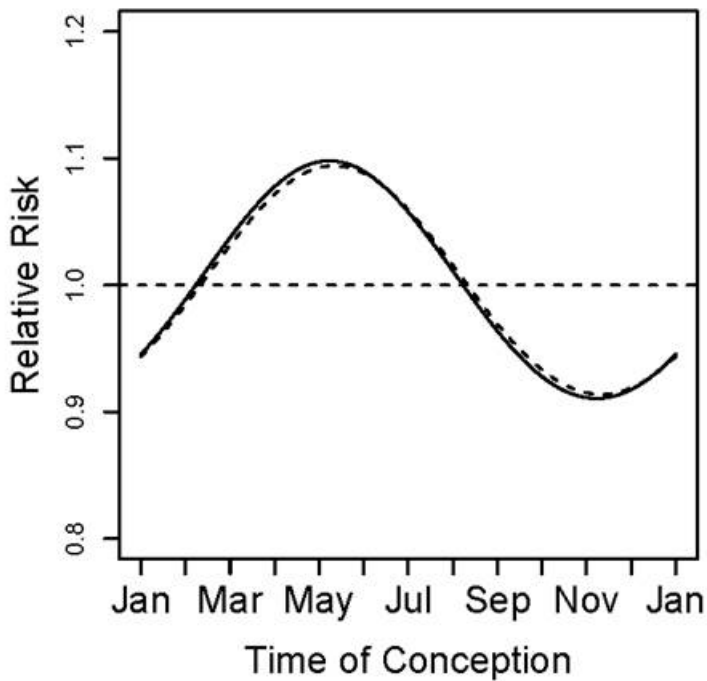




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